



City of Nashua
Division of Public Works

Wastewater Capital Projects

- Combined Sewer Overflow (CSO) Mitigation
 - Collection System Improvements
 - Treatment Plant Equipment Upgrades

Nashua Wastewater System

Collection

Combined Sewers (in inner city) - 100 miles

Separate Sanitary Sewers -190 miles

Separate Storm Drains -130 miles

CSO Outfalls - 8

- 4 Nashua River

- 4 Merrimack River

Sewage Pump Stations - 13

Catch Basins and Manholes - 19,500

Treatment Facilities

Wastewater Facility

- Ave Dry Weather Flow -

 - 11 Million Gal/Day (MGD)

- Wet Weather Capacity - 50 MGD

Wet Weather Treatment Facility -

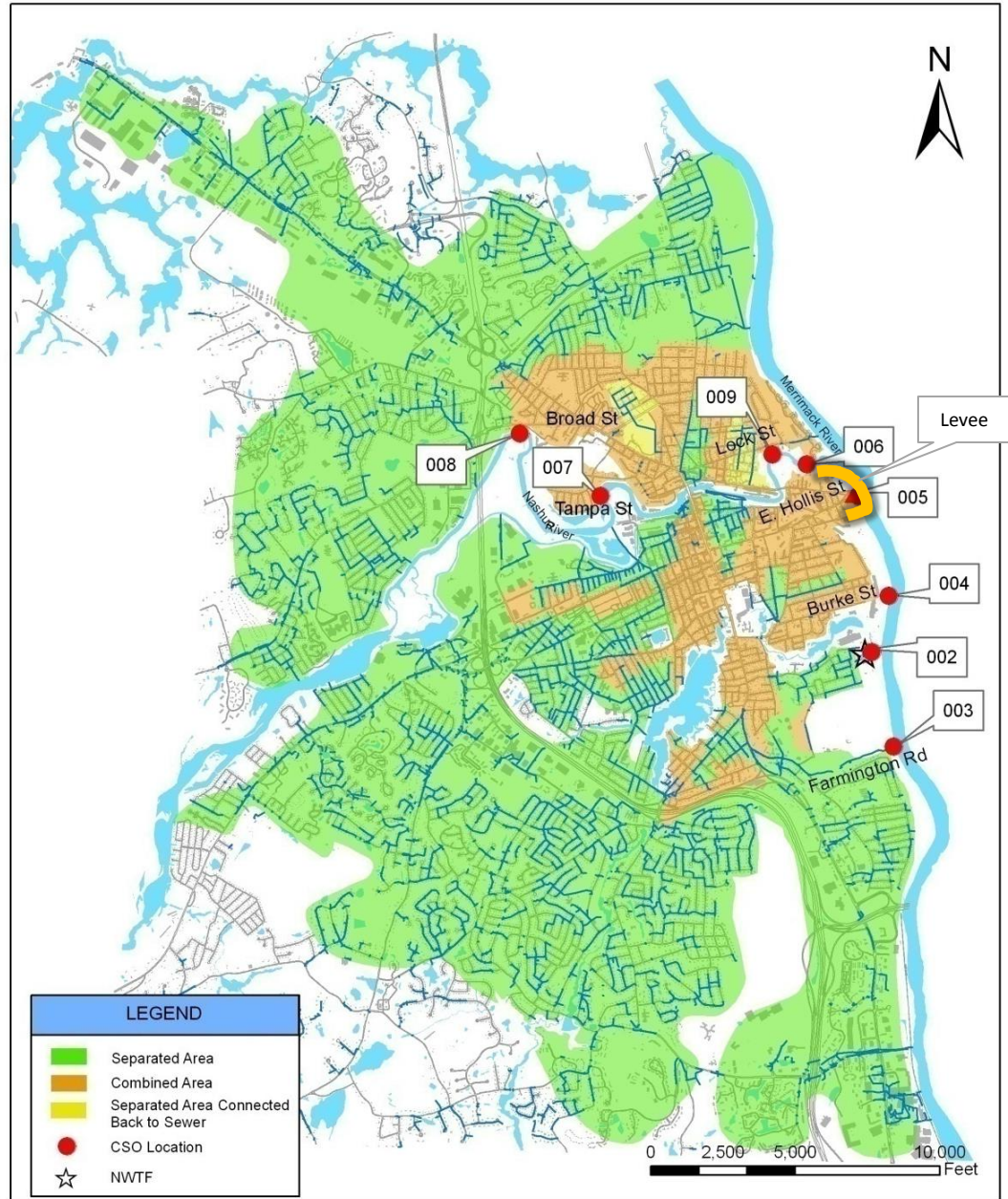
 - 60 MGD Capacity

Merrimack River Flood Control

Levee

Pump station

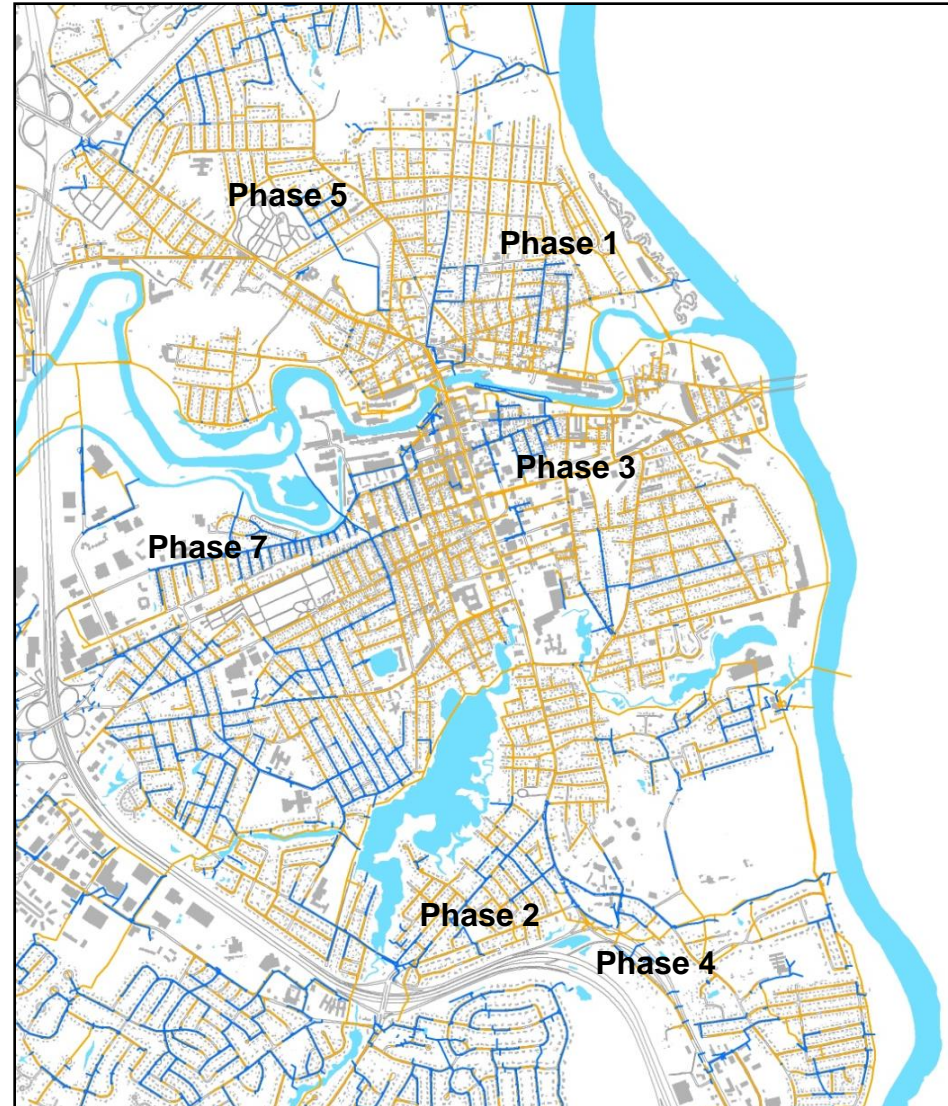
Emergency Overflow Basin



1999 EPA CSO Administrative Order: Complete Sewer Separation

- To separate 110 miles of combined sewers in 20 years – Est. \$250 Million

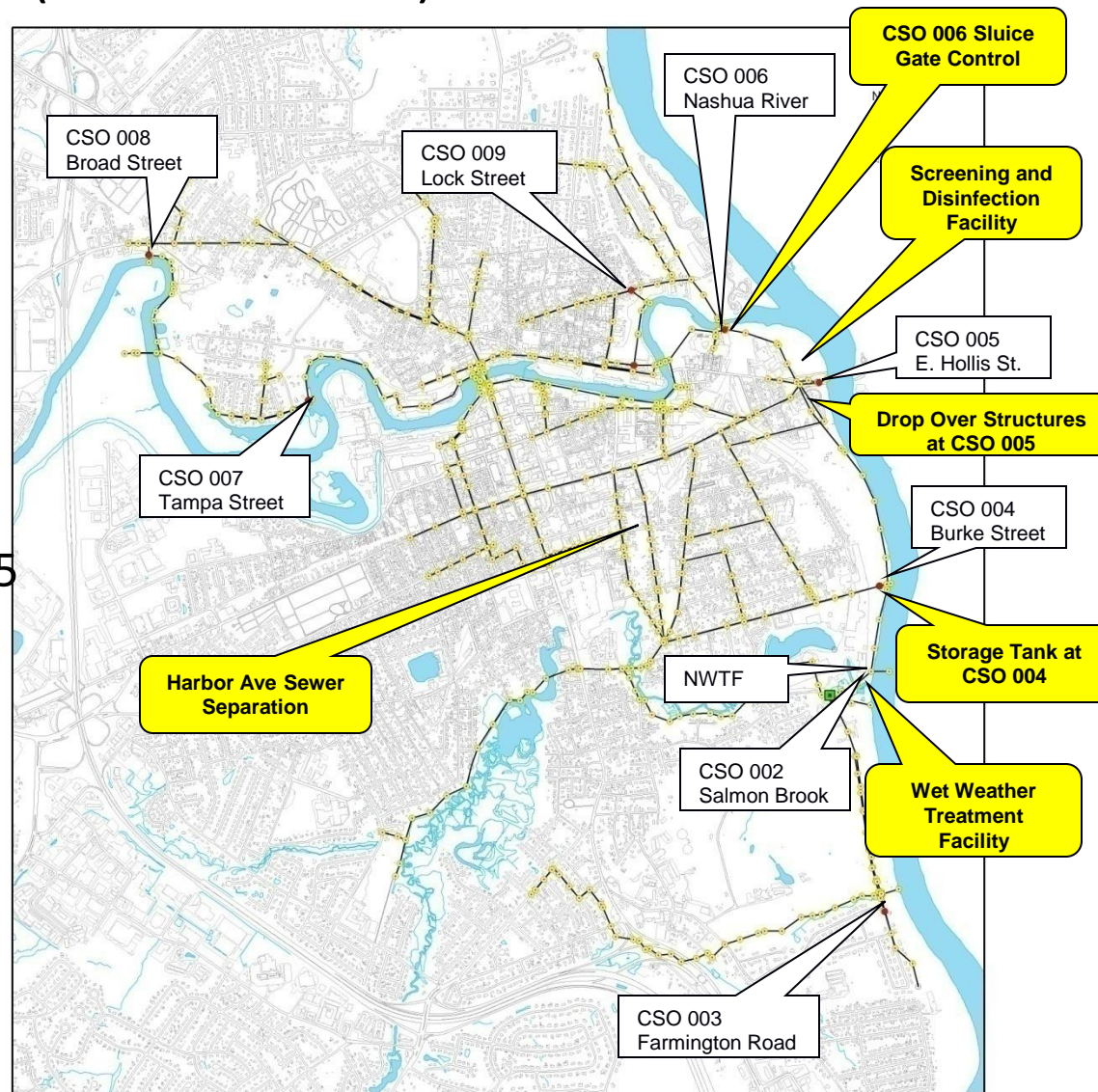
Completed between 1999-2006	Project Name	Miles of Sewers Separated
Phase 1	French Hill	2.10
Phase 2	East Dunstable Rd	2.16
Phase 3	Temple St/ East Pearl St	1.55
Phase 4	Main St/ South Main St	1.20
Phase 5	Sargents Ave	1.08
Phase 7	Ledge St	0.88
Total	About \$24.1 Million	8.97



2005 EPA CSO Consent Decree (Modified 2009)

Major Projects

- Wet Weather Flow Treatment Facility 60 MGD
- System Optimization of CSO Regulators
- Sluice Gate Control at CSO 006
- Drop Over Structures at CSO 005
- Harbor Ave Sewer Separation
- 40,000 Gallon Storage Tank at CSO 004
- Screening and Disinfection Facility 91 MGD at CSO 005 and CSO 006



Consent Decree CSO Project Costs

Project	Total Cost in \$ Million
Completed	
Wet Weather Flow Treatment Facility	\$32.38
System Optimization of CSO Regulators	\$1.81
Sluice Gate	\$0.90
Drop Over Structures	\$1.63
Harbor Ave Sewer Separation	\$5.08
In Progress	
(I)Storage Facility/(II)Burke St Infrastructure	\$5.76
Screening and Disinfection Facility	\$19.78
Annual Expenditures	
Inflow/Infiltration Removal Projects	\$0.50
Consent Decree Operational Expenditures	\$1.36
Total	\$69.20

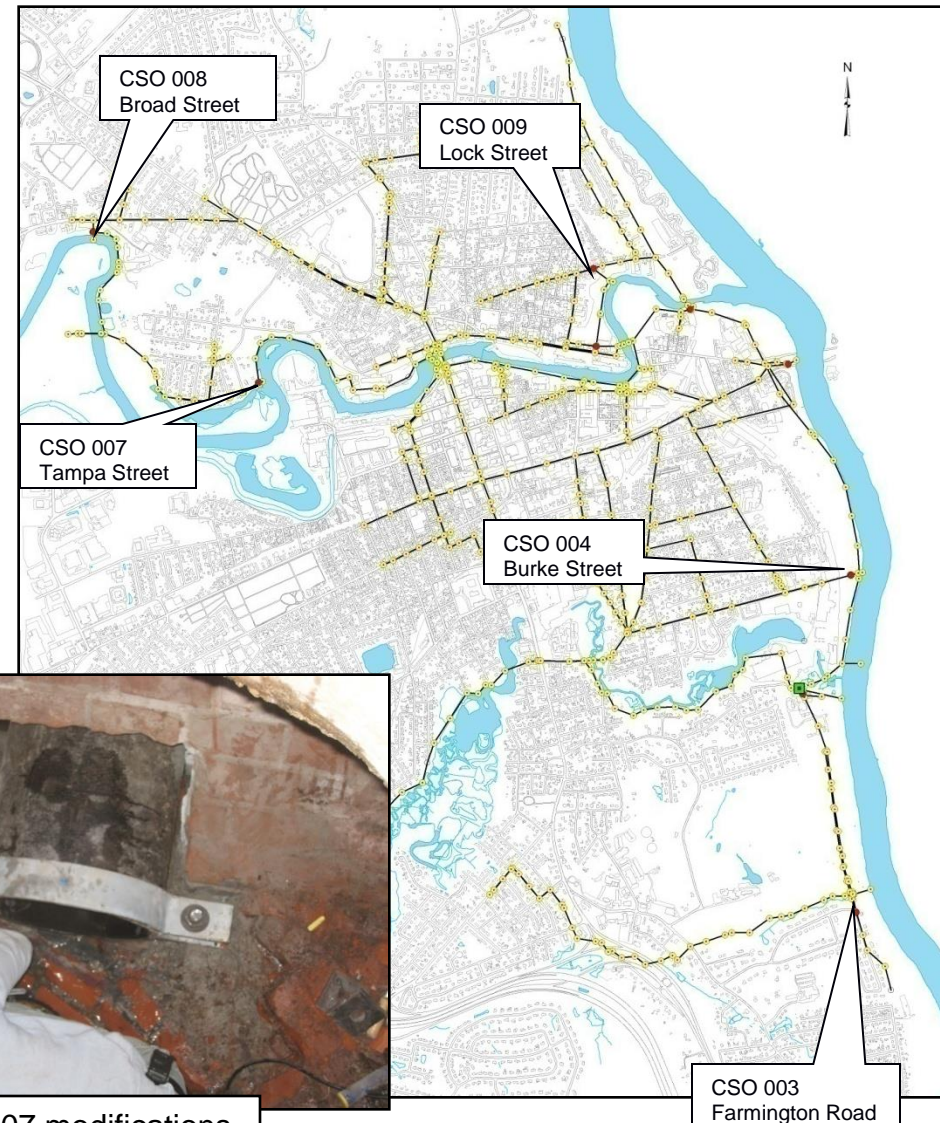
Wet Weather Flow Treatment Facility

- Located at Nashua Wastewater Treatment Facility
- Treats 60 MGD of wet weather flow
- Put in service January 2009
- Project Cost \$32.38 Mil



System Optimization of CSO Regulators

- Maximizes use of existing interceptor storage and transport capacity
- Locations CSO 3, CSO 4, CSO 7, CSO 8, and CSO 9
- Project Completed June 2009
- Project Cost \$1.81 Mil



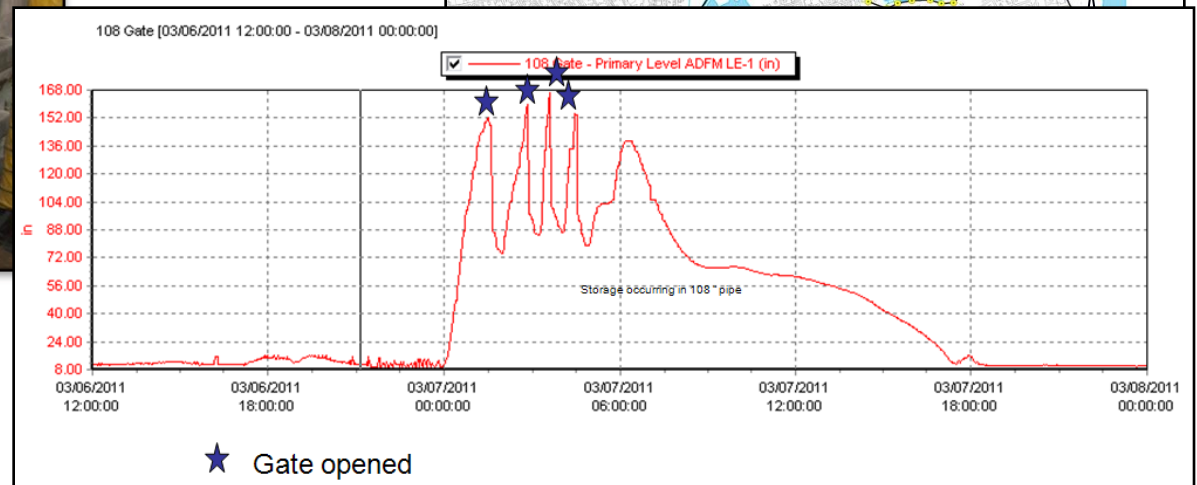
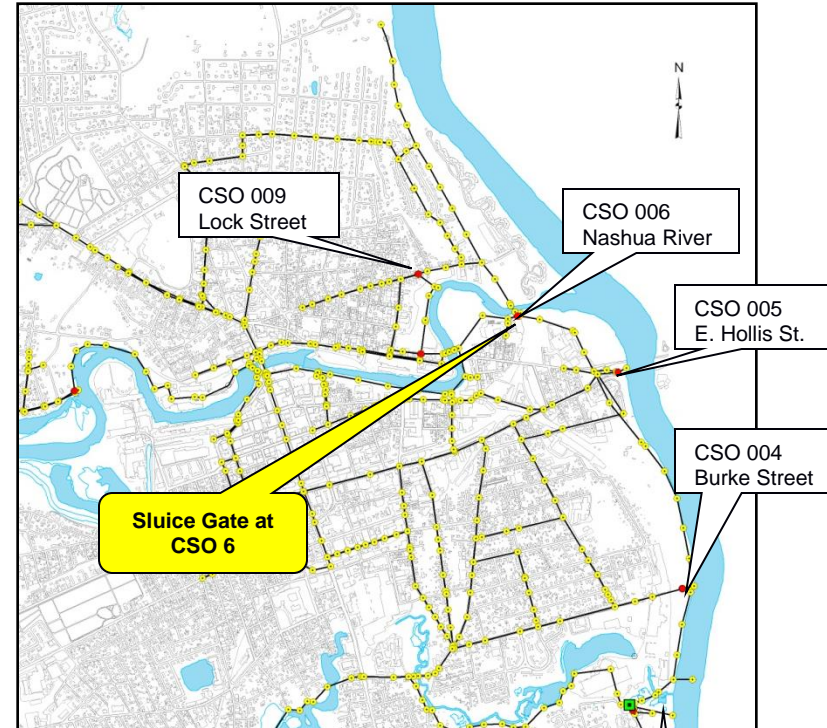
New weir wall CSO 008



CSO 007 modifications

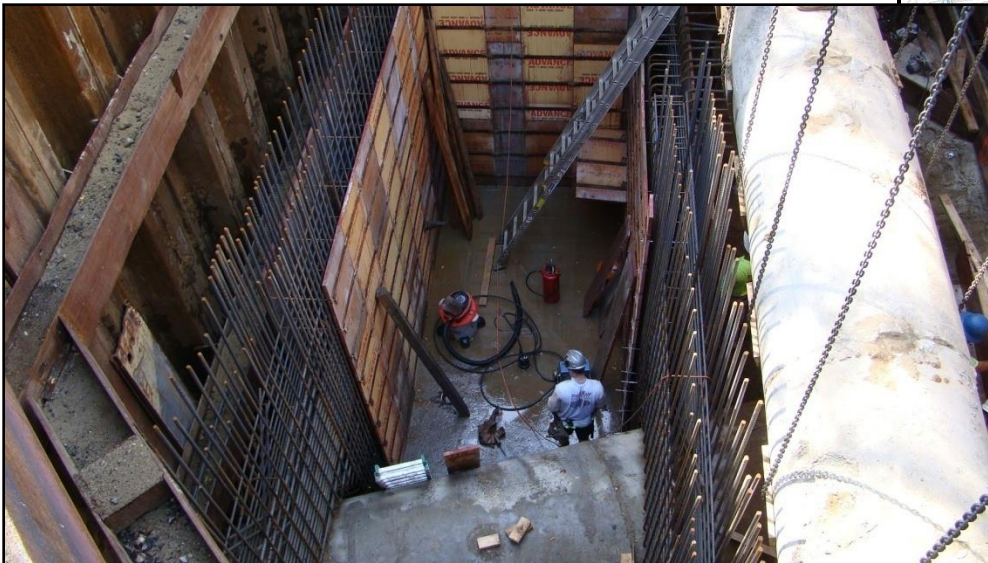
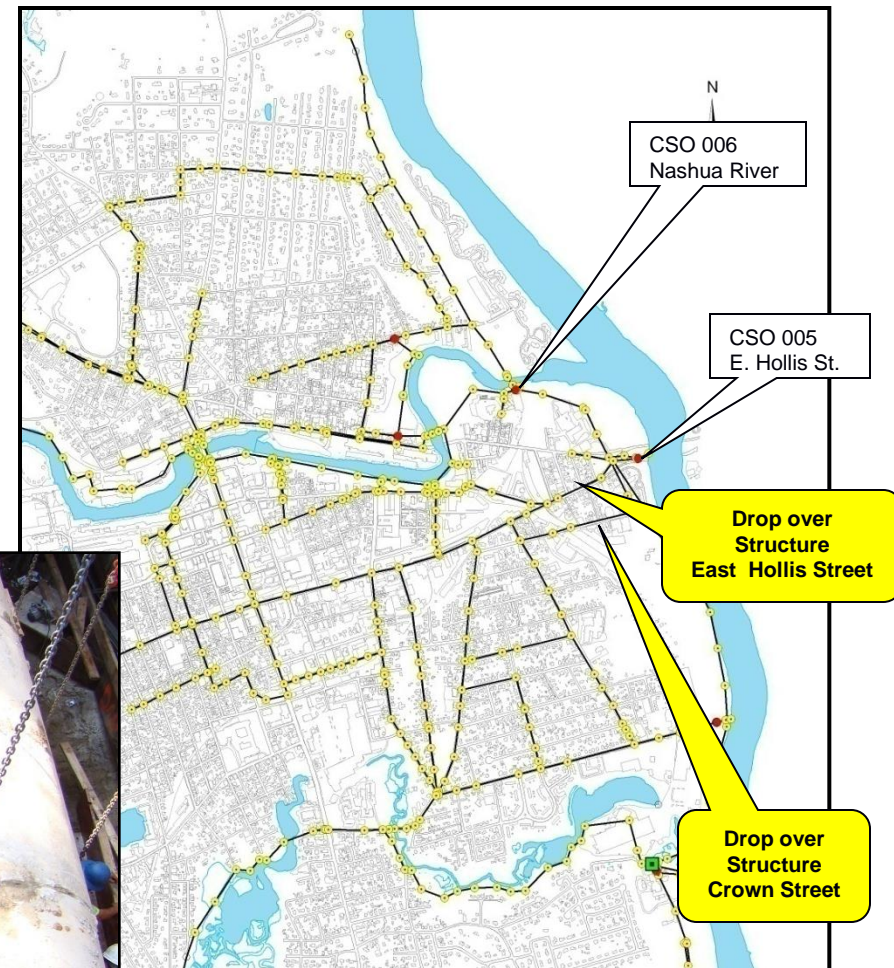
Sluice Gate Control at CSO 006

- Holds back wet weather flow in 108 inch Nashua River Interceptor and releases for treatment
- Put in service November 2010
- Project Cost \$0.90 Mil



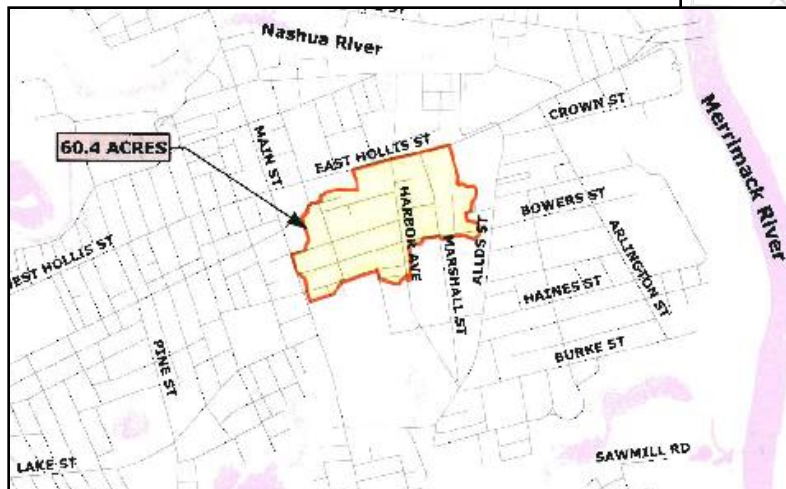
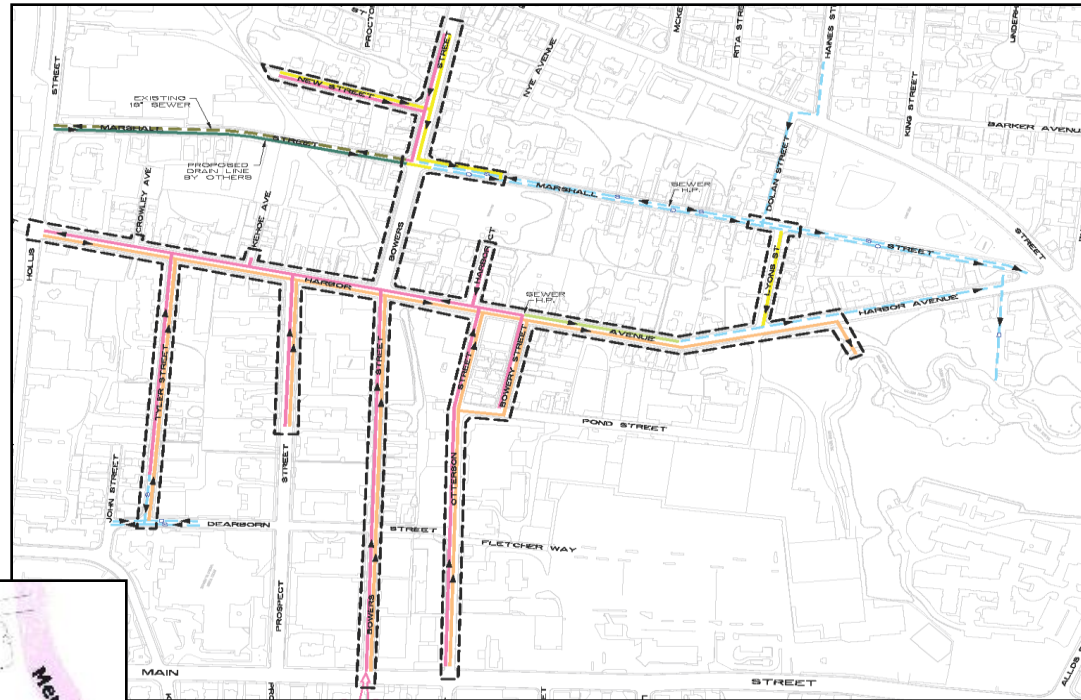
Drop Over Structures at CSO 005

- Diverts flow to the WWFTF via the North Merrimack River Interceptor
- Put in service December 2010
- Project Cost \$1.63 Mil



Harbor Avenue area Sewer Separation

- Separation of 1.5 miles combined sewers, 60 acres
- Reduces localized flooding and basement backups
- Pipes in service October 2012
- Final road restoration June 2014
- Project Cost \$5.08 Mil



CSO 4 Storage Tank/Burke St Infrastructure

I. Storage Facility

- 40,000 gallons capacity
- Operational December 2013



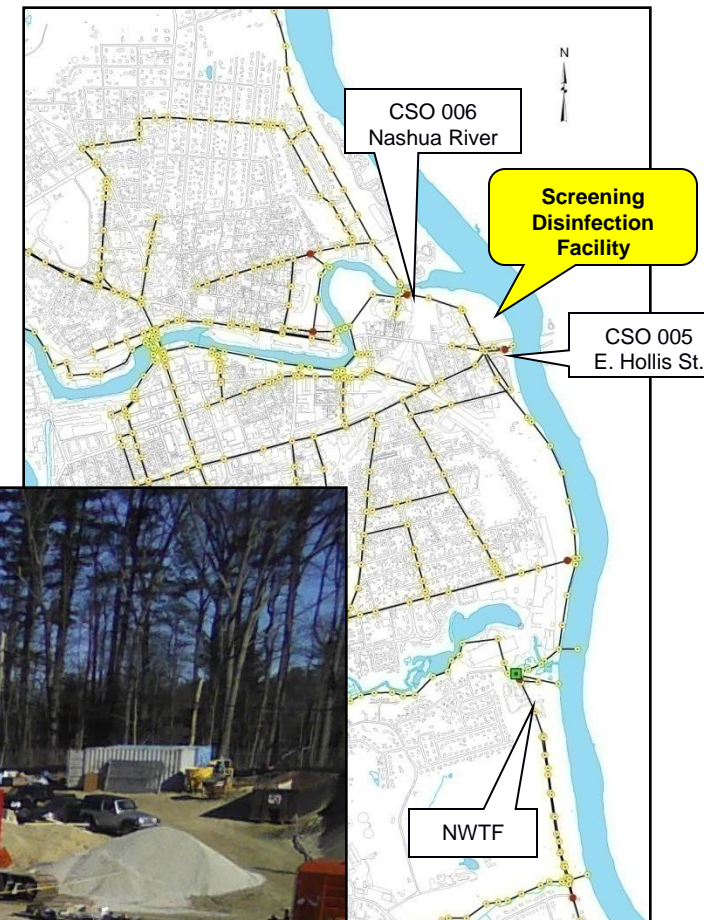
II. Infrastructure Improvements

- Pipe lining of 24" sewer main completed, 3,640 feet long
- Manhole construction - Spring 2014
- Service lines replacement, utility upgrades, street paving

Total Budget \$5.76 Million

Screening and Disinfection Facility

- To treat 91 MGD peak flow
- Located in Bancroft St off Bridge St
- Tank 450'x40'x10' deep, stores 1.0 Mil Gal
- Construction began August 2013
- Construction complete by August 2015
- Project Cost \$19.78 Mil

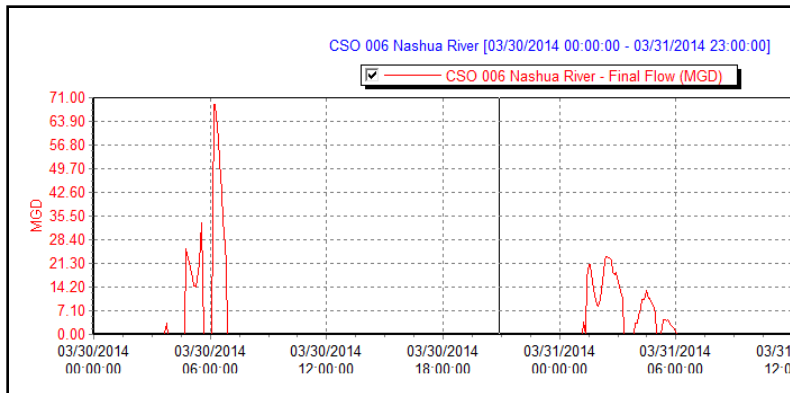


Inflow /Infiltration Removal

- Sewer lining
 - Manhole lining and grouting
 - Lining of sewers
 - Sewer point repairs
 - Disconnect catch basins from sanitary sewer
- Project Cost \$0.50 Mil



Consent Decree Operational Projects

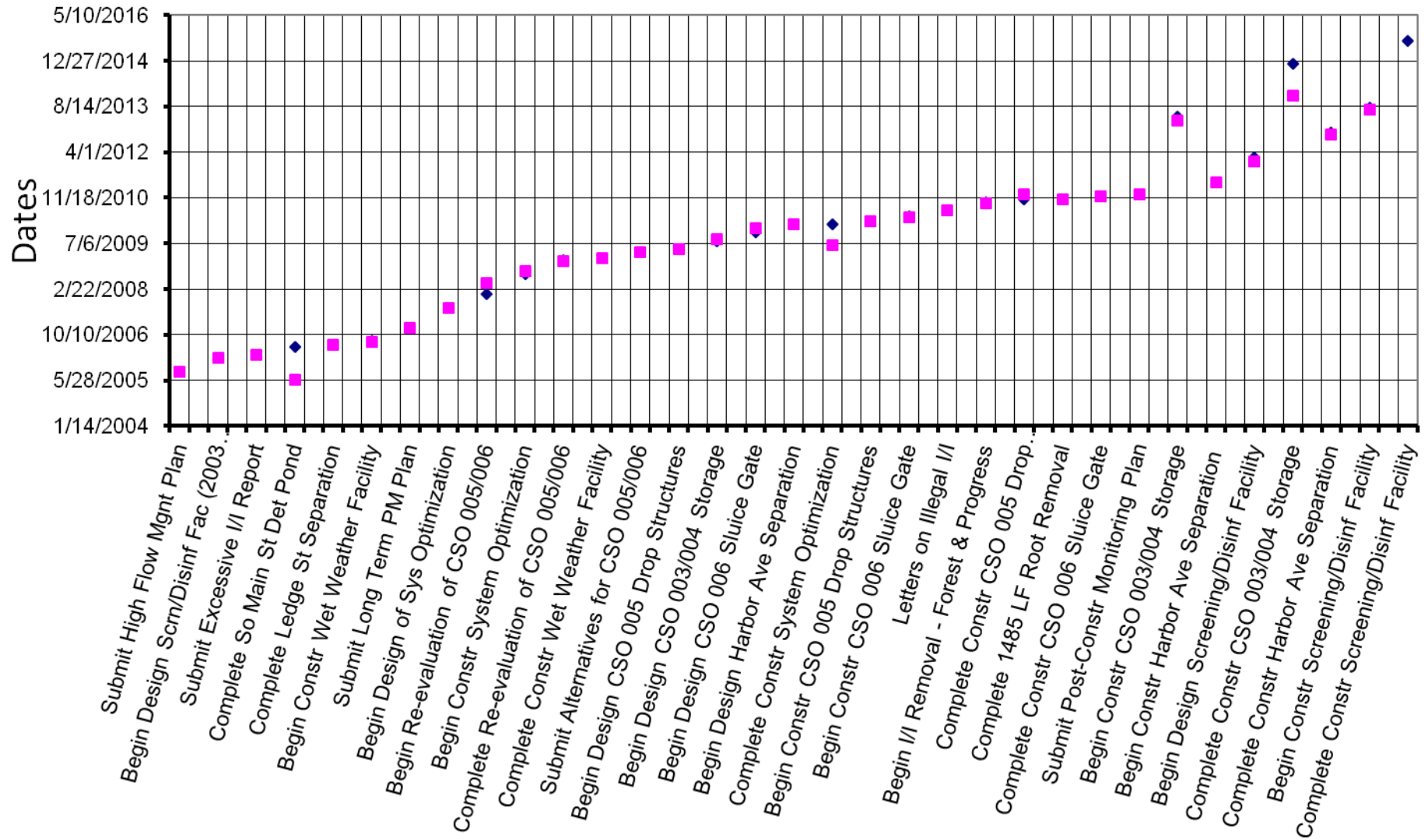


- Ongoing CSO flow monitoring
 - High Flow Management at Treatment Facility
 - Post Construction Monitoring for water quality
 - Develop and implement Operation and Maintenance Plan for collection system
- Project Cost \$1.36 for next six years

CSO Consent Decree Milestones

Legend

- ◆ Due Date
- Actual



Milestones

Collection System and Other Project Expenditures

Project	Total Cost in \$ Million
Completed	
Haines Street Sewer Separation	\$1.50
Manchester Street Sewer Capacity Evaluation	\$0.10
Net Metering	\$0.50
In Progress	
Aeration Blowers/Tank and Secondary Clarifier Upgrades	\$4.16
Dewatering Equipment Replacement	\$5.57
Other Capital Equipment	\$2.57
Annual Expenditures - Recurring	
Annual Sewer Infrastructure Improvements	\$1.32/yr
Sewer Structure Replacement	\$0.23/yr
CSO Flooding	\$0.40/yr
Stormwater Abatement	\$0.18/yr
Other Expenditures	
Merrimack River Levee	\$0.15
Bridge Street Emergency Overflow Basin	\$0.89
Hazard Mitigation	\$0.05

Completed

Haines Street Sewer Separation

- Separated a 21-acre low lying area
- 2,715 feet sewer, 3,005 feet drain pipe
- Completed 2010, \$1.50 Mil



Manchester Street Sewer Capacity Evaluation

- Recommended infiltration area off Beauview Ave with flow slipping on Charlotte and Beauview Aves, upsize sewer on Courtland St
- Completed 2011, \$94,000

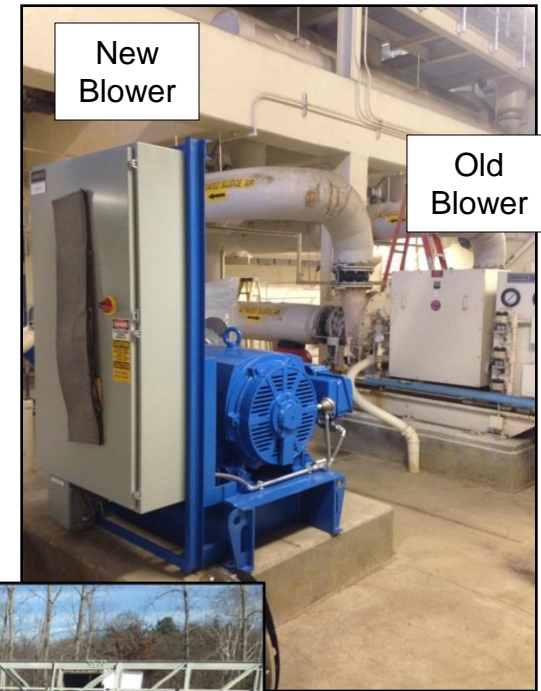
Net Metering at Treatment Facility

- Allowed for increased capacity of methane fueled generator to produce electricity
- Completed 2010, \$500,000



Aeration Blowers/Tanks and Secondary Clarifier Upgrades

- Three 25 year old blower units replaced with more energy efficient equipment
- Coating concrete walls of four aeration tanks
- Coating of concrete walls of the three secondary clarifiers , drive mechanisms and mechanical components renovated or replaced
- Project cost \$4.16 million



Secondary Clarifiers



Dewatering Equipment Replacement

- Complete overhaul of the 25 year old sludge dewatering system
- Three screw presses installed
- 4 Sludge Pumps
- 4 Polymer pumps
- Grit system components
- Project Cost \$5.57 Mil



Huber Sludge Press

Other Capital Equipment

- Drive units primary sludge thickeners
- Air handling unit sludge room
- Polymer activations system for sludge thickeners
- Grit system components
- Flow valves
- Sludge mixers



Total cost \$2.57 Mil

Annual Sewer Infrastructure Improvements

Year	Length of Sewer	Cost/Completion
2006 – 2010	12,750 LF	Completed for approx \$3.3 Mil
2011	3,500 LF	\$1.58 Mil completed
2012	6,000 LF	\$3.94 Mil, 95% completed
2013	6,650 LF	\$1.65 Mil, 30% complete
2014 to 2019	5,000 LF/YR	\$ 1.32 Mil increasing 5% per year

Sewer Structure Replacement

- Replaces triangular covers and frames with round ones that meet OSHA standards
- Replaces deteriorated and/or obsolete catch basin frames and grates as needed
- Replaces or repairs vertical structures as needed
- Annual Cost \$ 231,000, increases 5%/year
- In conjunction with street paving and with sewer replacement projects



CSO Flooding

- Low lying areas that remain problematic
- Issues with combined sewerage surcharging in the street during heavy rain events, basement back-ups, and street flooding
- Problem areas - Park Ave/Lawndale Ave area; Courtland St/Hall Ave area; C, D, E Sts; Marshall St (Bowers to East Hollis)
- Annual Cost \$400,000



Stormwater Abatement

- Address locations that have drainage issues during rain events
- Demonstration projects that promote water quality and infiltration as required by the EPA
- Projects include porous pavement, rain gardens, stormwater treatment units, drainage swales, etc.
- Annual funding \$180,000



Merrimack River Flood Control System

Levee Deficiencies – Overgrown trees, erosion, drainage, encroachment

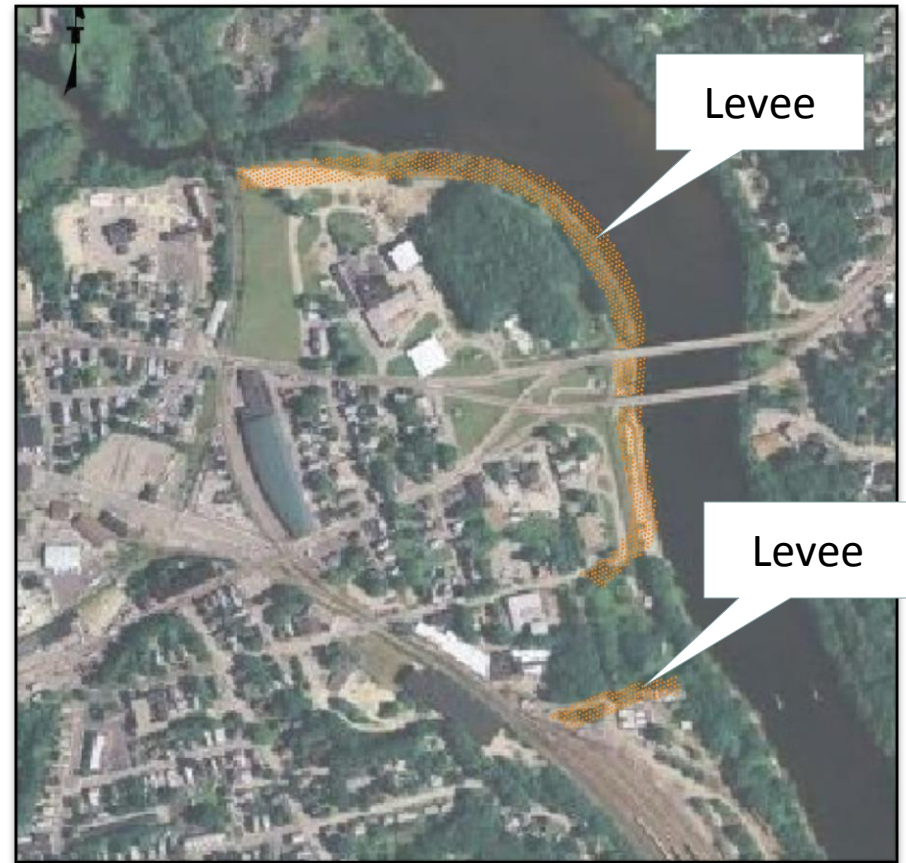
FY 2014 Budget \$ 150,000

Emergency Overflow Basin – Raw sewage discharge near Renaissance development. Needs to be eliminated

FY 2014 Budget \$ 890,000

Pump Station at CSO 005 – Equipment and controls obsolete

FY 2014 Budget \$ 50,000



Overall Project Cost Estimate \$2.5 to \$3.0 Mil

Capital Replacement Replacement Expenditures

- \$6,325,000 cost over next six years

Updated February 21, 2014		CAPITAL REPLACEMENT SCHEDULE			CDM 85-1 = Camp Dresser & McKee 1985 Contract		M&E 05 = Metcalf & Eddy Primary Clarifier Rehab Contract						
		NASHUA WASTEWATER FACILITY			CDM 85-1A = Camp Dresser & McKee 1985 Contract		CDM 82 = Camp Dresser & McKee Sewer Works Improvements Contract						
		FISCAL YEAR 2014			CDM 85-2 = Camp Dresser & McKee 1985 Contract		CDM 59 = Camp Dresser & McKee Original Treatment Plant						
		MINIMUM COSTS CONSIDERED FOR REPLACEMENT = \$10,000			S&W 98 = Stearns & Wheeler 1998 Contract								
RWH's Assessment		Assumptions:			M&E 06 = Metcalf & Eddy/AECOM 2006 Contract								
		Savings Interest Inflation Rates Compounded Annually					Savings Rate: 2.5%						
		Future Value is the Inflation Factor					Inflation Rate: 3.0%						
		Annual Reserve Payment is Discounted by Savings Rate											
							REPLACEMENT COSTS						
Item No.	Installer	Equipment Supplier	Equipment or Structure	Equip. ID No.	Plan	Plan Sheet Number	Picture ID	Year Acquired	Total Installed Cost	Years Before Replace	Replacement Year (fiscal)	Future Replacement Cost	Annual Reserve Payment
PLANT CAPITAL EQUIPMENT FUND													
1	In-House Mar! Only		Plant Water System (Multi Stage Pumps)	PWS 1	CDM 85-2	M-34		2009	\$120,000	20	2029	217,000	8,500
2	Eng & Contractor		Central Generator	CG1			Central Generator	1990	\$200,000	25	2015	419,000	12,300
3	Eng & Contractor		South Generator	SG1			South Generator	1990	\$210,000	27	2017	466,000	12,300
4	Eng & Contractor		Wet Wall Odor Control Mechanical (Fans, Carbon filter)	WWOC	CDM 85-2	M-38	Wet Wall HVAC	1992	\$100,000	25	2017	209,000	6,100
5	Contractor Only		Roof Administration Bldg	ADM 1	N/A			1995	\$45,000	20	2015	81,000	3,200
6	Contractor		Aeration Tanks Grid System (Aeration Project)-ABP	ATC 1	CDM 85-2	M-20		2013	\$285,000	20	2033	515,000	20,200
7	In-House Mar! Only		Aeration Tanks Diffusers - ABP	ATD 1	CDM 85-2	M-22 (D4)		2013	\$150,000	20	2033	271,000	10,600
8	Contractor Only		Blower Building Roof	BBR 1	N/A			1989	\$20,000	25	2014	42,000	1,200
9	Eng & Contractor		Control Building Instrumental	CB1			Control Room Main Panel	2000	\$70,000	15	2015	109,000	6,100
10	Contractor Only		Dechlor Building Roof	DBR 1	N/A			1991	\$15,000	28	2017	32,000	900
11	Contractor Only	Grit Chamber Upgrade	Grit Chamber Grit Classifier # 1 - SDP	GCC 1	CDM 85-1A	M-1	Grit Washer	2013	\$80,000	20	2033	144,000	5,637
12	Contractor Only	Grit Chamber Upgrade	Grit Chamber Grit Classifier # 2-GP	GCC 2	CDM 85-1A	M-1	Grit Washer	2013	\$80,000	20	2033	144,000	5,637
13	Contractor Only	Grit Chamber Upgrade	Grit Chamber Electrical - GF	GCE	CDM 85-1A	E-2	Grit Chamber Electrical	2013	\$225,000	20	2033	406,000	15,894
14	Contractor Only	Grit Chamber Upgrade	Grit Chamber HVAC GP	GCHV	CDM 85-1A	H-1	Wet Wall HVAC	2013	\$120,000	20	2033	217,000	8,495
15	Contractor Only	Grit Chamber Upgrade	Grit Chamber Instrumentation - GP	GCI	CDM 85-1A	E-1		2013	\$78,000	20	2033	141,000	5,520
16	Contractor Only	Grit Chamber Upgrade	Grit Chamber Piping - GP	GCP	CDM 85-1A	DM-2		2013	\$150,000	20	2033	271,000	10,609
17	Contractor Only	Grit Chamber Upgrade	Grit Pump # 1 - GP	GCP 1	CDM 85-1A	M-2	Grit Chamber Pumps	2013	\$60,000	20	2033	108,000	4,228
18	Contractor Only	Grit Chamber Upgrade	Grit Pump # 2 - GP	GCP 2	CDM 85-1A	M-2	Grit Chamber Pumps	2013	\$60,000	20	2033	108,000	4,228
19	Contractor Only		Grit Chamber Screw Conveyor # 1 - GP	GCS 1	CDM 85-1A	M-2		2013	\$60,000	20	2033	108,000	4,228
20	Contractor Only		Grit Chamber Screw Conveyor # 2 -GP	GCS 2	CDM 85-1A	M-2		2013	\$60,000	20	2033	108,000	4,228
21	Contractor Only	Grit Chamber Upgrade	Grit Chamber Compressor Cyclo Blower # 1 - GF	GCB 1	M&E 05	M-5		2013	\$40,000	20	2033	72,000	2,800
22	Contractor Only	Grit Chamber Upgrade	Grit Chamber Compressor Cyclo Blower # 2 - GF	GCB 2	M&E 05	M-5		2013	\$40,000	20	2033	72,000	2,800
23	Contractor Only		Grit Chamber Roof	GCR	N/A			2013	\$30,000	20	2033	54,000	2,114
24	In-House Mar! Only		Hypochlorite Chambers Influent Mixers # 1	HCM 1	CDM 85-1A	M-2		2010	\$12,000	7	2017	15,000	2,000
25			Hypochlorite Chambers Effluent Mixers # 1	HCM 1	CDM 85-1A	M-2		2010	\$12,000	7	2017	15,000	2,000
26	In-House Mar! Only		Hypochlorite Chambers Influent Mixers # 2	HCM 2	CDM 85-1A	M-2		2008	\$12,000	7	2015	15,000	2,000
27			Hypochlorite Chambers Effluent Mixers # 2	HCM 2	CDM 85-1A	M-2		2008	\$12,000	7	2015	15,000	2,000
28	Eng & Contractor	To be installed in 01/14	Primary gravity thickener tank Drive #1		CDM 85-2	M-40		2014	\$89,000	29	2043	210,000	5,000
29	Eng & Contractor	To be installed in 01/14	Primary gravity thickener tank Drive #2		CDM85-2	M-40		2014	\$89,000	29	2043	210,000	5,000
30	Eng & Contractor	new proj for 2014	Sludge Storage Tank 1 Mixing (Mixers 1 & 2)		CDM 85-2	M-40		1985	\$40,000	29	2014	94,000	2,200
31	Eng & Contractor	new proj for 2014	Sludge Storage Tank 2 Mixing (Mixers 1 & 2)		CDM 85-2	M-40		1985	\$40,000	29	2014	94,000	2,200
32	Eng & Contractor	new proj for 2014	Sludge Storage Tank 3 Mixing (Mixers 1 & 2)		CDM 85-2	M-40		1985	\$40,000	30	2015	97,000	2,200
33	Eng & Contractor	new proj for 2014	Sludge Storage Tank 4 Mixing (Mixers 1 & 2)		CDM 85-2	M-40		1985	\$40,000	30	2015	97,000	2,200
34	Eng & Contractor	new proj for 2014	Sludge Storage Tank 5 Mixing (Mixers 1 & 2)		CDM 85-2	M-40		1985	\$40,000	30	2015	97,000	2,200
35	In-House Mar! Only		Process Tanks Slide Gate Operator	PSI 1	M&E 05	M-9		1995	\$85,000	25	2020	178,000	5,200
36	Eng & Contractor		Primary Sludge Transfer Pumps (Piston Pump Room)	PST 1			Piston Pump Room	1985	\$25,000	30	2015	61,000	1,400
37	Eng & Contractor		Primary Sludge Transfer Pumps (Diaphragm Pump Room)	PST 2			Diaphragm Pump Room	1985	\$25,000	30	2015	61,000	1,400